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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/196,064	11/19/1998	HARM J. W. BELT	PHN16.638	8724

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BRIARCLIFF MANOR, NY 10510

EXAMINER

LAO, LUN S

ART UNIT	PAPER NUMBER
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2643

DATE MAILED: 02/02/2004

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/196,064

Applicant(s)

BELT ET AL.

Examiner

Lun-See Lao

Art Unit

2643

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 December 2003.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Introduction

1. This communication is responsive to the applicant's amendment filed 12/05/2003. Claims 1, 8 and 9-10 have been amended and claims 1-10 are pending.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-5 and 7-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over in view of Kellermann (US PAT 5,602,962) in view of Oh (US PAT. 5,353,376).

Consider claim 1, Kellermann teaches an audio arrangement for that utilizes an energy transfer function for delay compensation, said arrangement comprising:

a plurality (see fig.1, (M1, M2... Mn)) of audio sources generating a plurality of input audio signals (see col.3 lines 1-24);

a processor (2, preprocessor) comprising a scaling means for weighting the plurality of input signals and deriving a plurality of a processed audio signals from the plurality of input audio signals (see col.3 lines 25-35); and

a combiner (5, summer) that derives a combined audio signal from the plurality of processed audio signals (see col.3 line 45-col.4 line 55); but Kellermann does not clearly teach controller that causes the processor to maximize a power measure of the combined audio signal, wherein the controller is arranged to limit a combined power gain measure of the processed audio signals to a predetermined value without measuring an energy transfer at each site where one respective audio source of the plurality of audio sources receives the input audio signals.

However, Oh teaches a controller (see fig.1 14) that causes the processor (22,24,26) to maximize (larger) a power measure of the combined audio signal, wherein the controller is arranged to limit (minimize) a combined (28) power gain measure of the processed audio signals to a predetermined value (16, predetermined of period of time) without measuring an energy transfer at each site where one respective audio source of the plurality of audio sources receives the input audio signals (see col.3 line 10-col.4 line 5).

Therefore, it would obvious to one of ordinary skill in the art at the time invention was made to combine the teaching of Kellermann into Oh to provide a system for improving speech acquisition system to enhance the speech signal quality and thereby cause the output of a speech coder to sound better than that obtained using a single microphone.

Consider claim 2, Kellermann discloses that audio processing arrangement wherein the processor includes a scaling means for scaling the input audio signals with a scaling factor for obtaining the processed audio signal (see col.3 lines 45-61), said controller includes a further scaling means for deriving a plurality of scaled combined

audio signals with a scaling factor corresponding to the scaling factor of the scaling means (see fig 1), and in that the controller is arranged for maximizing a power measure of the combined audio signal (see col.3 line 35- col.4 line 55), and for limiting a combined power gain measure of the processed audio signals (see col.2 lines 1-12) by minimizing a difference between the input audio signals (s) and the scaled combined audio signals(x) corresponding to said audio signals $x = s + \text{noise}(n)$. Evaluation unit eliminates the noise signals; therefore the scaled combined audio signals (x) are approximately equal to the input audio signal(s), which minimized the difference between the combined audio signals (x) and input audio signals(s).

Consider claim 3, Kellermann teaches that the audio processing arrangement wherein the processor includes a plurality of adjustable filters (see fig.1, #3, #5, #6) for deriving the processed audio signal, in that the controller includes a plurality of further adjustable filters having a transfer function being the conjugate of the transfer function of the adjustable filters (see fig.1, #3, # 5, #6 and col.4 line 55-col.5 line 2), said further adjustable filters being arranged for deriving from the combined audio signal filtered combined audio signals, and in that the controller is arranged for maximizing the power measure of the combined audio signal (see col.3 line 45-col.4 line 55), and for restricting a combined power gain measure of the processed audio signals to a predetermined value by controlling the transfer functions of the adjustable filters and the further adjustable filters in order to minimize a difference measure between the input audio signals and the filtered combined audio signal corresponding to say input audio signals (see fig.2 and col.4 line 53-col.5 line).

Consider claim 4, Kellermann discloses that the audio processing arrangement comprises delay elements (see fig.1, #2) for compensating a delay difference of a common audio signal present in the input audio signals.

Consider claims 4-5 and 7, Oh teaches the audio processing arrangement of the audio processing arrangement comprises a delay elements (see fig.1, (16)) for compensating a delay difference of a common audio signal present in the input audio signals (see col.3 lines 13-63); and the audio processing arrangement of the audio sources comprise a plurality of microphones (see fig.1, 10), and in that the microphones are placed in a position such that their directionality patterns are substantially disjunct (10); and the audio processing arrangement of the audio sources comprise a plurality of microphones being placed in a linear array (see fig.10).

Consider claim 8 Kellermann teaches an audio signal processing arrangement that utilizes an energy transfer function for delay compensation (see abstract), said arrangement comprising a plurality of inputs (see fig.1, (M1, M2...Mn)) for receiving input audio signals, processing means (2) for deriving processed audio signals including scaling means for scaling the input audio signal (see col.3 lines 25-35), the audio processing arrangement comprising combining means (5) for deriving a combined audio signal from the processed audio signals (see col.3 line 62-col.4 54), but Kellermann does not clearly teach the audio processing arrangement comprises a control means for controlling the processing means in order to maximize a power measure of the combined audio signal, and in that the control means are arranged for limiting a combined power gain measure of the processed audio signals to a predetermined value

without measuring an energy transfer at each site where each respective one the plurality of audio sources receives the input audio signals.

However, Oh teaches the audio processing arrangement comprises a control means (14) for controlling the processing means (22,24,26) in order to maximize (larger) a power measure of the combined audio signal, and in that the control means are arranged for limiting (minimize) a combined power gain measure of the processed audio signals to a predetermined value (predetermined of period of time) without measuring an energy transfer at each site where each respective one the plurality of audio sources receives the input audio signals (see fig.1 (10) and col.3 15-col.4 15).

Therefore, it would obvious to one of ordinary skill in the art at the time invention was made to combine the teaching of Kellermann into Oh to provide a system for improving speech acquisition system to enhance the speech signal quality and thereby cause the output of a speech coder to sound better than that obtained using a single microphone.

Consider claim 10, there is a method claim corresponding to apparatus claim 8.
See previous apparatus claim 8 rejection.

Consider claim 9, Kellermann discloses that the audio signal processing arrangement the scaling means (see fig.1, M1,M2...Mn and (2)) scale the input audio signals with a scaling factor for obtaining the processed audio signals (see col.3 lines 45-61), said control means (4) comprise further scaling means (2) for deriving a plurality of scaled combined audio signals with a scaling factor corresponding to the scaling factor of the scaling means (see fig.1), and in that the control means are arranged for

maximizing a power measure of the combined audio signal (see col.3 line 45- col.4 line 55), and for limiting a combined power gain measure of the processed audio signals (see col.2 lines 1-12) by minimizing a difference between the input audio signals (s) and the scaled combined audio signals(x) corresponding to said audio signals $x = s + \text{noise}(n)$. The noise signals are eliminated by evaluation unite, therefore the scaled combined audio signals (x) are approximately equal to the input audio signal(s), which minimized the difference between the combined audio signals (x) and input audio signals(s).

4. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kellermann (US PAT. 5,602,962) as modified by Oh (US PAT 5,353,376) as applied to claim 1 above, and further in view of Kaneda (US PAT 4,536,887).

Consider claim 6, Kellermann and Oh do not teach clearly the audio processing arrangement of the microphones are placed around a center position at angles being equal to 360 degrees divided by the number of microphones.

However, Kaneda discloses that the audio processing arrangement includes that the microphones are placed around a center position at angles being equal to 360 degrees divided by the number of microphones (see fig.21d and col.20 line 10-col.21 line 20).

Therefore, it would obvious to one of ordinary skill in the art at the time invention was made to combine the teaching of Kellermann and Oh into teaching of Kaneda to provide microphone-array apparatus which can be constructed on a small scale and

permits adaptive selection of the desired signal for varied positions of a desired signal and noise sources.

Response to Arguments

5. Applicant's arguments with respect to claims 1-10 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

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7. Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

Washington, D.C. 20231

or faxed to: (703) 872-9306

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington.


VA., Sixth Floor (Receptionist).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lao,Lun-See whose telephone number is (703) 305-2259. The examiner can normally be reached on Monday-Friday from 8:00 to 6:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Curtis Kuntz, can be reached on (703) 305-4708.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 whose telephone number is (703) 306-0377.

Lao,Lun-See
Patent Examiner
US Patent and Trademark Office
Crystal Park 2
(703305-2259)


DUC NGUYEN
PRIMARY EXAMINER